

- 24 -

## CLAIMS

1. A method for generating a population of myeloid like blood dendritic cells or lymphoid like blood dendritic cells from CD34<sup>+</sup> precursor cells said method comprising sorting said CD34<sup>+</sup> precursor cells into a population of either myeloid precursor cells characterized by the markers CD33<sup>+</sup>, CD7<sup>-</sup>, CD10<sup>-</sup> or a population of lymphoid precursor cells characterized by the markers CD34<sup>+/+</sup>, CD7<sup>+</sup>, CD10<sup>+</sup>, culturing or expanding the myeloid or lymphoid precursor cells in the combination of Flt3, SCF, IL-3 and/or IL-6 for a time and under conditions sufficient for the myeloid precursor cells to give rise to the myeloid like blood dendritic cells characterized by being CD11c<sup>+</sup> and CD123<sup>-</sup> and the lymphoid precursor cells to give rise to lymphoid like blood dendritic cells characterized by being CD11c<sup>-</sup>, CD123<sup>hi</sup>.
2. The method of any one of Claim 1, wherein said CD34<sup>+</sup> precursor cells are isolated from a biological sample selected from the group consisting of peripheral blood, PBCMs, stem cells, monocytes, amniotic fluid, chorionic villus, cord blood, and tissue.
3. The method according to any one of Claims 1 or 2, wherein said population of CD34<sup>+</sup> precursor cells is differentiated into a specific lineage of dendritic cells selected from the group consisting of myeloid dendritic cells, lymphoid dendritic cells, Langerhans cells, interstitial dendritic cells, Afferent lymph veiled cells, blood dendritic cells and interdigitating cells.
4. The method of Claim 3, wherein said population of CD34<sup>+</sup> precursor cell is differentiated into a heterogenous population of dendritic cells.
5. The method of Claim 3, wherein said population of CD34<sup>+</sup> precursor cells is differentiated into a substantially homogenous population of dendritic cells.

- 25 -

6. The method of Claim 1, wherein the cytokine is selected from the group consisting of flt3, SCF, IL-3, IL-6, GM-CSF, G-CSF, TNF- $\alpha$ , IL-4, TNF- $\beta$ , LT- $\beta$ , IL-2, IL-7, IL-9, IL-15, IL-13, IL-5, IL-1 $\alpha$ , IL-1 $\beta$ , IFN- $\gamma$ , IL-10, IL-17, IL-16, IL-18, HGF, IL-11, MSP, FasL, TRAIL, TRANCE, LIGHT, TWEAK, CD27L, CD30L, CD40L, APRIL, TALL-1, 4-1BBL, OX40L, GITRL, IGF-I, IGF-II, HGF, MSP, FGF-a, FGF-b, FGF-3-19, NGF, BDNF, NTs, Tpo, Epo, Ang1-4, PDGF-AA, PDGF-BB, VEGF-A, VEGF-B, VEGF-C, VEGF-D, PIGF, EGF, TGF- $\alpha$ , AR, BTC, HRGs, HB-EGF, SMDF, OB, CT-1, CNTF, OSM, SCF, Flt-3L, M-CSF, MK and PTN or their functional, recombinant or chemical equivalents or homologues thereof.
7. The method of Claim 6, wherein the cytokine is selected from the group consisting of flt3, SCF, IL-3, IL-6, GM-CSF, G-CSF, TNF- $\alpha$  or their functional, recombinant or chemical equivalents or homologues thereof.
8. The method of Claim 1, further comprising presenting a peptide on the surface of the dendritic cells, thereby providing a population of antigen presenting dendritic cells.
9. The method of Claim 8, wherein said antigen presenting cell is capable of activating a population of T cells.
10. The method of Claim 9, wherein said population of T cells occurs *in vitro*.
11. The method of Claim 9, wherein said population of T cells occurs *in vivo*.
12. The method of any one of Claims 9 to 11, wherein the T cell is selected from a population of CD4<sup>+</sup> T cells and/or CD8<sup>+</sup> T cells.
13. The method of Claim 9, wherein said peptide is derived from a polypeptide isolated from a human protein, a pathogen protein or a protein derived from a cancer cell.

- 26 -

14. The method of Claim 13, wherein said pathogen is selected from the group consisting of viruses, bacteria, fungi, ectoparasites, mycoplasmas, *Archea*, algae, oomycetes, slime molds, nematodes and amoebae.
15. The method of Claim 14, wherein said virus is selected from the group consisting of Human Immunodeficiency Virus (HIV), the human papilloma virus, Epstein-Barr virus, the polio virus, the rabies virus, the Ebola virus, the influenza virus, the encephalitis virus, smallpox virus, the rabies virus, the herpes viruses, the sendai virus, the respiratory syncytial virus, the orthomyxoviruses, the measles viruses, the vesicular stomatitis virus, visna virus and cytomegalovirus.
16. The method of Claim 14, wherein said fungi is selected from the group consisting of *Acremonium* spp., *Aspergillus* spp., *Basidiobolus* spp., *Bipolaris* spp., *Blastomyces dermatidis*, *Candida* spp., *Cladophialophora carrionii*, *Coccidioides immitis*, *Conidiobolus* spp., *Cryptococcus* spp., *Curvularia* spp., *Epidermophyton* spp., *Exophiala jeanselmei*, *Exserohilum* spp., *Fonsecaea compacta*, *Fonsecaea pedrosoi*, *Fusarium oxysporum*, *Fusarium solani*, *Geotrichum candidum*, *Histoplasma capsulatum* var. *capsulatum*, *Histoplasma capsulatum* var. *duboisii*, *Hortaea werneckii*, *Lacazia loboi*, *Lasiodiplodia theobromae*, *Leptosphaeria senegalensis*, *Madurella grisea*, *Madurella mycetomatis*, *Malassezia furfur*, *Microsporum* spp., *Neotestudina rosatii*, *Onychocola canadensis*, *Paracoccidioides brasiliensis*, *Phialophora verrucosa*, *Piedraia hortae*, *Piedra ia hortae*, *Pityriasis versicolor*, *Pseudallesheria boydii*, *Pyrenochaeta romeroi*, *Rhizopus arrhizus*, *Scopulariopsis brevicaulis*, *Scytalidium dimidiatum*, *Sporothrix schenckii*, *Trichophyton* spp., *Trichosporon* spp., Zygomycete fungi, *Absidia corymbifera*, *Rhizomucor pusillus* and *Rhizopus arrhizus*.
17. The method of Claim 14, wherein said bacteria are selected from the group consisting of *Bacillus anthracis*, *Bordetella pertussis*, *Vibrio cholerae*, *Escherichia coli*, *Shigella dysenteriae*, *Clostridium perfringens*, *Clostridium botulinum*, *Clostridium tetani*, *Corynebacterium diphtheriae*, *Pseudomonas aeruginosa*, *Bacillus anthracis*, *Bordetella pertussis*, *Staphylococcus aureus* and *Streptococcus pyogenes*.

- 27 -

18. The method of Claim 13, wherein said cancer cell is isolated from a cancer cell associated with a cancer selected from the group consisting of ABL1 protooncogene, AIDS Related Cancers, Acoustic Neuroma, Acute Lymphocytic Leukaemia, Acute Myeloid Leukaemia, Adenocystic carcinoma, Adrenocortical Cancer, Agnogenic myeloid metaplasia, Alopecia, Alveolar soft-part sarcoma, Anal cancer, Angiosarcoma, Aplastic Anaemia, Astrocytoma, Ataxia-telangiectasia, Basal Cell Carcinoma (Skin), Bladder Cancer, Bone Cancers, Bowel cancer, Brain Stem Glioma, Brain and CNS Tumours, Breast Cancer, CNS tumours, Carcinoid Tumours, Cervical Cancer, Childhood Brain Tumours, Childhood Cancer, Childhood Leukaemia, Childhood Soft Tissue Sarcoma, Chondrosarcoma, Choriocarcinoma, Chronic Lymphocytic Leukaemia, Chronic Myeloid Leukaemia, Colorectal Cancers, Cutaneous T-Cell Lymphoma, Dermatofibrosarcoma-protuberans, Desmoplastic-Small-Round-Cell-Tumour, Ductal Carcinoma, Endocrine Cancers, Endometrial Cancer, Ependymoma, Esophageal Cancer, Ewing's Sarcoma, Extra-Hepatic Bile Duct Cancer, Eye Cancer, Eye: Melanoma, Retinoblastoma, Fallopian Tube cancer, Fanconi Anaemia, Fibrosarcoma, Gall Bladder Cancer, Gastric Cancer, Gastrointestinal Cancers, Gastrointestinal-Carcinoid-Tumour, Genitourinary Cancers, Germ Cell Tumours, Gestational-Trophoblastic-Disease, Glioma, Gynaecological Cancers, Haematological Malignancies, Hairy Cell Leukaemia, Head and Neck Cancer, Hepatocellular Cancer, Hereditary Breast Cancer, Histiocytosis, Hodgkin's Disease, Human Papillomavirus, Hydatidiform mole, Hypercalcemia, Hypopharynx Cancer, IntraOcular Melanoma, Islet cell cancer, Kaposi's sarcoma, Kidney Cancer, Langerhan's-Cell-Histiocytosis, Laryngeal Cancer, Leiomyosarcoma, Leukaemia, Li-Fraumeni Syndrome, Lip Cancer, Liposarcoma, Liver Cancer, Lung Cancer, Lymphedema, Lymphoma, Hodgkin's Lymphoma, Non-Hodgkin's Lymphoma, Male Breast Cancer, Malignant-Rhabdoid-Tumour-of-Kidney, Medulloblastoma, Melanoma, Merkel Cell Cancer, Mesothelioma, Metastatic Cancer, Mouth Cancer, Multiple Endocrine Neoplasia, Mycosis Fungoides, Myelodysplastic Syndromes, Myeloma, Myeloproliferative Disorders, Nasal Cancer, Nasopharyngeal Cancer, Nephroblastoma, Neuroblastoma, Neurofibromatosis, Nijmegen Breakage Syndrome, Non-Melanoma Skin Cancer, Non-Small-Cell-Lung-Cancer-(NSCLC), Ocular Cancers, Oesophageal Cancer, Oral cavity

- 28 -

Cancer, Oropharynx Cancer, Osteosarcoma, Ostomy Ovarian Cancer, Pancreas Cancer, Paranasal Cancer, Parathyroid Cancer, Parotid Gland Cancer, Penile Cancer, Peripheral-Neuroectodermal-Tumours, Pituitary Cancer, Polycythemia vera, Prostate Cancer, Rare-cancers-and-associated-disorders, Renal Cell Carcinoma, Retinoblastoma, Rhabdomyosarcoma, Rothmund-Thomson Syndrome, Salivary Gland Cancer, Sarcoma, Schwannoma, Sezary syndrome, Skin Cancer, Small Cell Lung Cancer (SCLC), Small Intestine Cancer, Soft Tissue Sarcoma, Spinal Cord Tumours, Squamous-Cell-Carcinoma-(skin), Stomach Cancer, Synovial sarcoma, Testicular Cancer, Thymus Cancer, Thyroid Cancer, Transitional-Cell-Cancer-(bladder), Transitional-Cell-Cancer-(renal-pelvis/-ureter), Trophoblastic Cancer, Urethral Cancer, Urinary System Cancer, Uroplakins, Uterine sarcoma, Uterus Cancer, Vaginal Cancer, Vulva Cancer, Waldenstrom's-Macroglobulinemia, Wilms' Tumour.

19. The method of Claim 13, wherein the human protein is associated with an autoimmune disease.

20. The method of Claim 19, wherein the autoimmune disease is selected from the group consisting of Addisons Disease, Allergies, Anemia, Ankylosing Spondylitis, Arthritis, Celiac Disease, Crohns Disease, Diabetes, Endometriosis, Fibromyalgia, Graves Disease, Hashimotos Disease, Hypothyroidism, Immune Diseases, Lupus, Lymphoma, Meniere's Disease, Multiple Sclerosis, Oral Diseases, Osteoporosis, Pleurisy, Psoriasis, Reiters Syndrome, Rheumatoid Arthritis, Sarcoidosis, Scleroderma, Sjogrens Syndrome, Thrush, Vitiligo, Alopecia Areata, Antiphospholipid Syndrome (APS), Behcet's Disease, Ulcerative Colitis, Goodpasture Syndrome, Graft Versus Host Disease, Guillain-Barre Syndrome, Multiple Sclerosis, Myasthenia Gravis, Myositis, Pemphigus Vulgaris, Primary Biliary Cirrhosis, Rheumatic Fever, Vasculitis and Wegener's Granulomatosis.

21. A method for inducing a protective immune response against an autoimmune disease in a subject comprising administering to said subject in need of treatment a therapeutically effective amount of a composition comprising an antigen-presenting dendritic cell generated according to Claim 19.

- 29 -

22. The method of Claim 19, wherein the autoimmune disease is selected from the group consisting of Addisons Disease, Allergies, Anemia, Ankylosing Spondylitis, Arthritis, Celiac Disease, Crohns Disease, Diabetes, Endometriosis, Fibromyalgia, Graves Disease, Hashimotos Disease, Hypothyroidism, Immune Diseases, Lupus, Lymphoma, Meniere's Disease, Multiple Sclerosis, Oral Diseases, Osteoporosis, Pleurisy, Psoriasis, Reiters Syndrome, Rheumatoid Arthritis, Sarcoidosis, Scleroderma, Sjogrens Syndrome, Thrush, Vitiligo, Alopecia Areata, Antiphospholipid Syndrome (APS), Behcet's Disease, Ulcerative Colitis, Goodpasture Syndrome, Graft Versus Host Disease, Guillain-Barre Syndrome, Multiple Sclerosis, Myasthenia Gravis, Myositis, Pemphigus Vulgaris, Primary Biliary Cirrhosis, Rheumatic Fever, Vasculitis and Wegener's Granulomatosis.
23. A method for inducing a protective immune response against cancer in a subject comprising administering to said subject in need of treatment a therapeutically effective amount of a composition comprising an antigen-presenting dendritic cell generated according to Claim 18.
24. A method for inducing a protective immune response against a pathogen in a subject comprising administering to said subject in need of treatment a therapeutically effective amount of a composition comprising an antigen-presenting dendritic cell generated according to any one of Claims 13 to 17.